Z14/Z14R User Manual

JVA TECHNOLOGIES
www.jva-fence.com

Contents

1 Introduction 6

2 Features And Benefits 8

2.1 More Features 8

2.2 Z14R Additional features 9

3 Specifications 10

4 Description 12

4.1 JVA Z14 - Exterior 12

4.2 Front Panel Status Lights 13

4.3 Front Panel LCD Display 13

4.4 Inputs and Outputs 13

4.5 Status Codes 13

4.6 Keypad (Optional) 14

4.7 Z Series Models 14

4.8 Keypad (Optional) 15

4.9 Internal Beeper/Keypad Beeper 15

4.10 Programmable Options 15

4.11 Arm input (control input 1) and Key Switch 15

4.12 Gate Input (control input 2) 16

4.13 Low Power mode 16

4.14 Group Simultaneous Pulse Feature 16

4.15 Remote Control Unit (Optional) 16

4.16 Cabling 17

4.17 Lightning Protection 17

4.18 Earth Loop Monitoring 17

4.19 Noise and Interference 17

4.20 PC control 18

4.21 Web Server 18

5 Description 18

5.1 Installation Steps 18

5.2 JVA Z14 - Interior Configuration 20

5.3 Examples of Fence (High Voltage) Wiring Diagrams 21

5.4 Control 22

5 Description 18
5.1 Installation Steps 18
5.2 JVA Z14 - Interior Configuration 20
5.3 Examples of Fence (High Voltage) Wiring Diagrams 21
5.4 Control 22
5.5 Turning to Low Power Mode 23
5.6 When an Alarm Occurs 23
5.7 To Silence the Alarm 23
5.8 Changing the PIN Number 24
5.9 Standby Battery 24
5.10 Status Light 24
6 Technical Information 25
6.1 Power Options 26
6.2 Status Codes 26
6.3 Jumpers 27
6.4 Configuring a Z14 to run in Bi-Polar mode 28
6.5 Tamper Circuit (Z14R, Z18 Mk2) 28
7 Installation Programming Options 29
7.1 Programming Mode 29
7.2 To Exit Programming Mode 29
7.3 Changing the Installer PIN 29
7.4 Changing an Option 30
7.5 Programming Options in Brief 30
7.6 Programming Options in Detail 32
7.6.1 Power Level (01x#) 32
7.6.2 Low Power Level (02x#) 33
7.6.3 Fence Alarm Voltage (03x#) 33
7.6.4 Low Power Alarm Level (05x#) 34
7.6.5 Missed Pulse Count (06x#) 34
7.6.6 Battery Alarm Voltage (07x#) 35
7.6.7 Siren On Time (08x#) 36
7.6.8 Siren Off time (09x#) 36
7.6.9 Siren Cycles (10x#) 37
7.6.10 Input Type (11x#) 38

7.6.6 Battery Alarm Voltage (07x#) 35
7.6.7 Siren On Time (08x#) 36
7.6.8 Siren Off time (09x#) 36
7.6.9 Siren Cycles (10x#) 37
7.6.10 Input Type (11x#) 38
7.6.11 Input 2 Function (12x#) 38
7.6.12 Gate Entry/Exit Delay (13x#) 38
7.6.13 Chime Mode (14x#) 39
7.6.14 Binary Options (16x#) 40
7.6.15 Anti-Bridging threshold (17x#) 41
7.6.16 Binary Options 2 (18x#) 41
7.6.17 Auto Re-arm Time (20x#) 42
7.6.18 Relay Functions 44
Siren Off time (09x#) . . . . .
7.6.19 Group Mode (26x#) 46

8 JVA Z14 LCD Keypad Features 48

8.1 Keypad status LEDs 48
8.1.1 Arming/Disarming the Fence Using the Keypad 49
8.1.2 Menus 49
8.1.3 Keypad Status Display 49
8.1.4 Changing the Keypad Messages and Address 50
8.2 To Exit Keypad Programming. 51
8.3 Connecting Multiple Keypads to a system 51
8.4 Notes Regarding Keypad Configuration 52
8.5 Calibrating the voltage display. 53
8.6 Summary of LCD Keypad Functions 55

9 Remote Control Unit 57

9.1 Features 57
9.2 Installation 58
9.3 Operation and configuration 59

10 Standard Requirements for Security Electric Fences 59

10.1 Definitions 59
10.2 General requirements for electric fences 60
10.3 Particular requirements for electric animal fences in Australia 62
10.4 Installation of electric security fences 63

1 Introduction

Thank you for purchasing a JVA security electric fence energiser. The growing use of non-lethal electric security fences around the world is indicative of the confidence security professionals are placing in this form of perimeter security. The reason for this popularity is simple – monitored electric security fences are effective and they reduce false alarms when compared to other technologies.

DEMARCATION The JVA electric fence around your property shows you mean business.

DEFLECTION Intruders are deflected to softer targets.

DETERRENCE The safe, powerful JVA shock is a strong deterrent to intruders.

DELAY The barrier will help delay an intruder, giving you more time to react.

DETECTION The JVA's voltage monitor warns you of any tampering with the fence.

DEPENDABLE 60 seconds a minute, 60 minutes an hour, 24 hours a day, 365 days a year, your JVA electric security fence is monitored by an alert, sober, electronic watchman.

Once every second the JVA Z14 energiser produces a very short-duration, safe, high-voltage pulse and sends it down the fence live wires. The JVA Z14 then monitors the voltage at the end of this live wire, checking that the voltage is being maintained along the entire fence line. In the event of a voltage drop caused by shorting, cutting or poor fence maintenance, the monitor will trigger an alarm, alerting you to the problem.

Designed and manufactured to meet the most stringent international safety standards, the JVA Z14 is in a class of its own when it comes to features and benefits at an affordable price.

© JVA Technologies Pty. Ltd.

2 Features And Benefits

Australian designed and manufactured	High reliability and great service
Programmable Options	Customise the energiser to unique fence conditions
Wall-mountable, robust enclosure with easily detachable PCB chassis	Ease of installation and repair
Inbuilt LCD voltage display and status lights	See fence conditions at a glance
Internal 7Ah 12V rechargeable battery	Ensure continued operation of your security electric fence in the event of a mains power failure
Optional LCD Keypad	Ease of control and display of fence voltages
Optional PC and internet connections	Integration with security information management systems
Low Power mode	Detection together with reduced voltage for during the day
Switched +12V outputs for Siren and Strobe	Local audible and visual indication alerting user to breach of security
Earth monitor input	Ensures that all the wires on the fence are monitored continually
Enclosed fence terminals	Tamper resistant and prevents accidental contact with high voltage

2.1 More Features

- Meets Safety and EMC standards (reports available on request)
- Powerful 4 joules peak output energy
- High and low Power mode

© JVA Technologies Pty. Ltd.

- High and low Power mode
- Built in charger and space for a 12V 7.2aH backup battery
- Alarms on fence short or open circuit
- Control and programming via LCD keypad
- Monitor via PC (using Perimeter Patrol software)
- Internal beeper
- AC fail, Low Battery and Bad Battery detection
- Large number of keypad programmable options
- Adjustable fence voltage level
- Can be configured as conventional OR Bi-Polar
- Two Control Inputs which can be configured to take NO or NC contacts
- Two 12V driven Outputs (also referred to as Relays

2.2 Z14R Additional features

- Three "Form C" Relays with dry contacts or switched voltage Output
- Relays may be assigned to any alarm function
- Infrared tamper beam disables the Energiser if the lid is removed
- Approved for sale in Australia and New Zealand (Electrical Safety Approval).

3 Specifications

SPECIFICATION NAME	SPECIFICATION
Energiser Output Voltage	9.5kV peak no load
Peak Output Energy	4 Joules at 500 Ohms
Pulse Rate	Locked at 0.8 Hz
12v Dc Power Consumption	Energiser On – 550mA Average, 700mA peak Energiser Off – 28mA (40mA with keypad) Not including keypad or auxiliary power
Ac Power Input	16-18Vac
Battery Charger Output	Float voltage 14V, 500mA, short circuit and reverse polarity protection
Siren and Strobe Outputs	Self-resetting fuse protection, switched 12V, rated at 30W (combined)
Enclosure	IP4x ABS plastic
Size	300mm high, 190mm wide, 115mm deep
Weight – packed, no battery	1.9kg

© JVA Technologies Pty. Ltd.

- There are no user-serviceable parts in this unit.
- The installer is reminded that high voltages are retained for a while after switching off, and to wait for at least 10 minutes before opening the case.
- Before working on the high voltage wiring of an electric fence, it is recommended that the energiser be turned off and an intentional short circuit be placed from the fence live wires to earth.
- Electric fences are not toys; do not let children play with them.

4 Description

4.1 JVA Z14 - Exterior

© JVA Technologies Pty. Ltd.

4.2 Front Panel Status Lights

POWER	On whenever the unit has power
ARMED	On when the unit is armed (pulsing), will flash when in Low Voltage mode
FENCE	Green when voltage on and OK, Red when there is a fence alarm
GATE	On when there is a gate alarm
STATUS	The number of times the Status Light flashes indicates the status of the energiser. See the table in section 6.2 – Status Codes.

4.3 Front Panel LCD Display

The display on the JVA Z14 shows the voltage at the fence and return terminals. The left is the return and the right is the feed voltage. Arrows at the top of the display indicate that the Energiser is in conventional mode. When configured for Bi-Polar operation the left side is the positive Return Voltage and the right is the negative Return Voltage.

The LCD also shows the programming option and current setting when in programming mode. This allows the programming options settings to be checked easily.

4.4 Inputs and Outputs

See Section 6.

4.5 Status Codes

See Section 6.2.

4.6 Keypad (Optional)

A keypad can be used to remotely monitor and control the Z14. It is also used to set the programmable options for installer programming options, see Section 8.

4.7 Z Series Models

Z11 Single Zone, conventional 1.5 Joule.
Z13 Single Zone, conventional 2.8 Joule.
Z14 Single Zone, conventional or Bi-Polar 4 Joule.
Z14R Z14 with relays and IR Tamper circuit.
Z18 Single Zone, conventional or Bi-Polar 8 Joule, contains relays and IR Tamper circuit.
Z28 Dual Zone, conventional 8 Joule (4 Joules per zone).
ZM1 Single zone start of fence monitor with Distant Fault Detection ™
ZM20 Twenty sector loop monitor

Note: A Z14 configured for Bi-polar may be referred to as a Z14A.

© JVA Technologies Pty. Ltd.

4.8 Keypad (Optional)

The Z series LCD keypad allows for easy remote control of your JVA energiser. Arming and disarming, responding to alarms or just checking the fence voltage, the LCD keypad makes this easy through a simple menu system or key sequences (shortcuts). Your security is protected by a user PIN number.
A keypad is also required to program the programmable options, see Section 7.
For information on how to control the Z14 via the keypad, see Section 8.1.1.

4.9 Internal Beeper/Keypad Beeper

Depending on the chime setting, the internal beeper and keypad beeper will sound when there is a fence alarm, a gate alarm, a door chime or a general alarm. Should the battery voltage run low, the keypad will beep 4 times before the energiser automatically enters Low Power mode to preserve the battery.

4.10 Programmable Options

The Z14 has many programmable options. These are also known as setup parameters. To alter these options, a keypad must be used. The options are explained in Section 7.6. Each parameter has a factory set default.

4.11 Arm input (control input 1) and Key Switch

The JVA Z series energiser can be armed (to energise the fence) by closing a contact wired into the arm input. On some models a key switch is fitted to the right-hand side of the case for this purpose.
An external switch device, for example a remote receiver or access control keypad, can also be wired into the energiser to arm and disarm the unit.

4.12 Gate Input (control input 2)

The gate input may be wired to a gate switch to trigger an alarm when a gate is opened. Alternatively, it may be programmed as a control input for Low Power mode. This is determined by the programmable option settings.
It is also possible to arm the gate alarm only. See Section 7.6.12 for details.

4.13 Low Power mode

Z14 energisers can be switched into Low Power mode. Low Power mode may be used in situations where the fence is not required to be a deterrent but is still required to actively detect intrusion. In Low Power mode the fence live wires operate at a much lower voltage, typically 500V peak. See Section 8.1.1 for details on using the keypad to set Low Voltage mode.

4.14 Group Simultaneous Pulse Feature

In some installations it may be preferable to provide the ability to link multiple units into a group. When linked, the individual Z series energisers become a Group. As many as fifteen energisers can be grouped. Individual units in a Group have simultaneous high voltage output pulses and act as if they are one energiser with multiple outputs. This is designed so that no possible combination of individual outputs can be dangerous.

4.15 Remote Control Unit (Optional)

The Remote Control Unit provides the Z14 with the ability to arm or disarm the energiser via a compact key chain fob remote control. If using the remote control the siren can be used to acknowledge arming with 1 beep and disarm with 2 beeps, see programming option 7.6.13 .

© JVA Technologies Pty. Ltd.

The remote controls have a range of up to 100 metres.
They come fitted with a LR27A 12V battery that will provide up to 2 years service.

4.16 Cabling

High Voltage Cabling (Fence Feed and Returns) should be run using suitably rated cable. Double insulated electric fence "underground" cable is suitable. High Voltage Cables must never be run within the same conduit as Low Voltage Cables. A minimum distance of 30mm should be kept between High Voltage and Low Voltages Cables.

To maintain the IPx4 rating of the enclosure and to ensure moisture does not enter the enclosure via the cable entry area a silicon sealant (neutral cure) must be used to seal all the cable passages.

4.17 Lightning Protection

Although the Z14 contains internal lightning protection elements, external lightning protection elements such as additional external lightning protection kits are recommended to further reduce lightning damage and thus reduce repair costs. They are available from your local dealer.

4.18 Earth Loop Monitoring

The Z14 has two fence earth terminals. If the earth monitoring facility is not required, the Earth Out and Earth Return terminals must be joined with a wire bridge. Directions on how to wire for earth loop monitoring are in Section 5.3.

4.19 Noise and Interference

The Z14 contains a microprocessor. Extreme electrical noise can upset microprocessors. The most likely cause of such noise is the high

voltage output from the unit itself. In the event of erratic behaviour, check that the high voltage wiring is firmly connected to the terminals and that no sparking is seen. The Z14 is designed to self-recover from interference. Powering off (both AC and battery) should not be necessary.

4.20 PC control

A standard Windows PC may be used to control and monitor a group of Z series energisers. Ask your JVA distributor for a demonstration of Perimeter Patrol ™ software. Z series energisers can be connected to a PC using either a serial data adaptor, such as the PAE223 or TCP/IP using a PAE212.

4.21 Web Server

Another alternative to remotely controlling JVA Z series energisers is to use the PAE225 Webserver. When suitable configured this allows the energiser to be controlled and monitored via a web browser from any internet connected device anywhere in the world.

5 Description

JVA recommends installation by qualified technicians.

5.1 Installation Steps

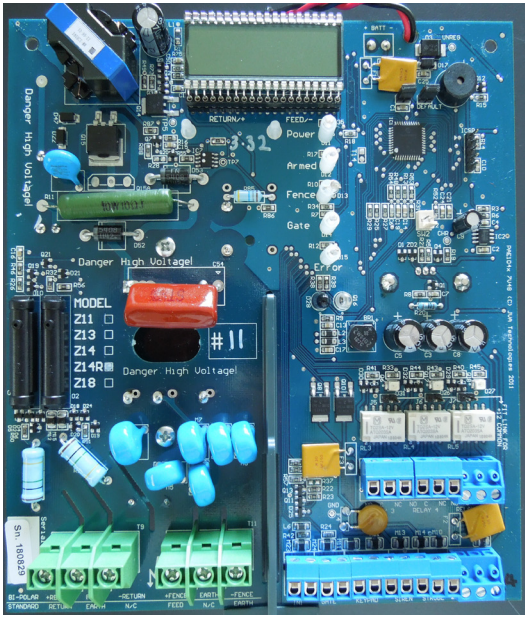
1. Read the entire manual first!
2. Design and build the fence. (Beyond the scope of this manual.) Ask your distributor for help if required.
3. Decide where the JVA Z14 is to be mounted. If on an extenal wall it should be housed within a waterproof equipment box and definitely not in direct sunlight.
4. Remove the JVA Z14 PCB chassis from the housing by removing the 2 screws.

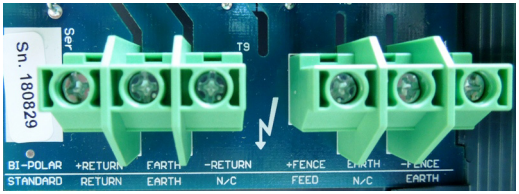
© JVA Technologies Pty. Ltd.

5. Mount the housing by using 4 screws through the rear of the box.
6. Replace the PCB chassis.
7. If using a keypad, remove the rear housing of the keypad and fix it to the wall.
8. Wire the low voltage cables to the PCB terminals*. (See Sec tion 5.2)
9. Wire the high voltage cable to the PCB terminals*. (See Sec tion 5.2)
10. If earth monitoring is not going to be used on the fence, con nect a bridge wire from earth out to earth return.
11. Ensure that the key switch is off.
12. Fit the battery leads to the battery. The Status Light should blink twice repetitively to show mains fail, unless J3 is fitted.
13. Mount the 230 – 16V transformer and connect the 16V side to the Z14 16V input terminals. (AC is not polarity sensitive.) Do not connect a live or neutral to the earth terminal.
14. Replace the front cover.
15. Turn AC power on.
16. Arm and disarm the energiser via the keyswitch or keypad, if fitted. The Status Light should stop blinking.
17. Arm the unit.
18. Check to ensure that a short anywhere on the fence triggers the alarm.
19. Ensure that the user understands how to change the user code (PIN) and is in possession of this Installer/User Manual and the installer's contact details.

* NOTE: Keep high voltage and low voltage cables at least 30mm apart. Do not run high and low voltage cables in the same conduit qualified technicians.

5.2 JVA Z14 - Interior Configuration



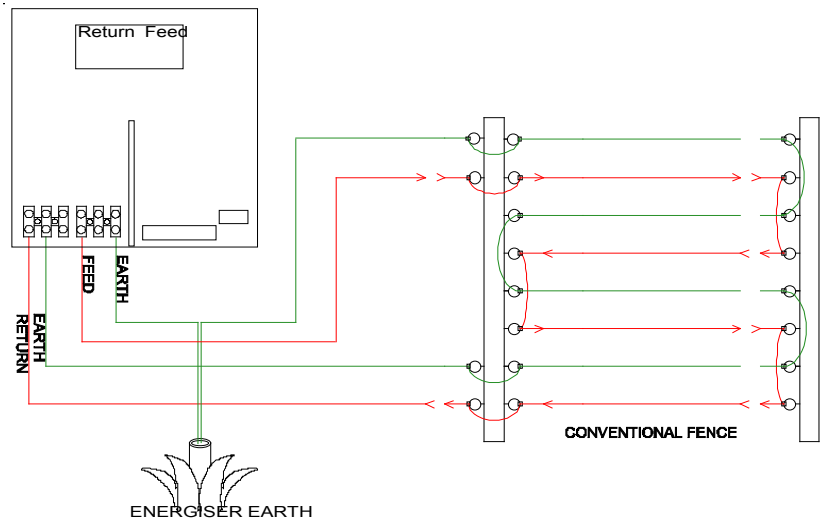


High Voltage Terminal

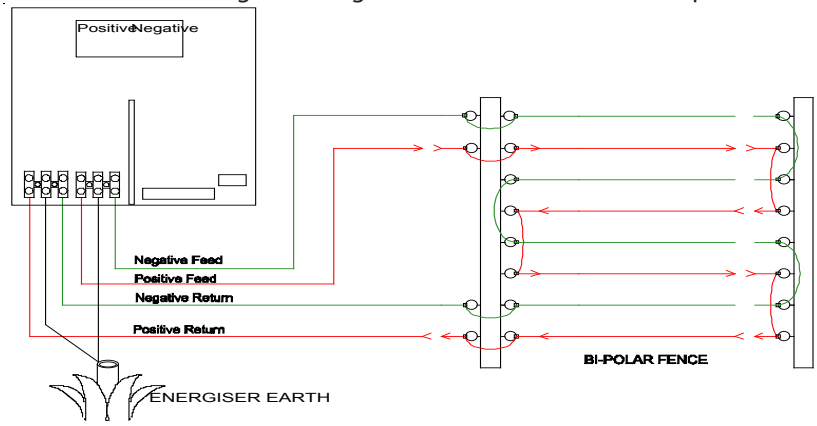
Low Voltage Terminal

© JVA Technologies Pty. Ltd.

5.3 Examples of Fence (High Voltage) Wiring Diagrams



Z14R Energiser configured for conventional fence operation



Z14R Energiser configured for Bi-polar operation

5.4 Control

Your JVA Z14 security energiser has been designed for ease of operation.
Key Switch: In its simplest form, the energiser is controlled by the key switch on the side of the unit.

Keypad: The energiser can be installed in a convenient location close to the fence, while the keypad can be positioned in an easily accessible place. The systems status information, e.g. mains power, energiser on/off, fence voltages, fence alarm, auxiliary alarm, etc., are displayed on the keypad.

If a keypad is connected, the key switch and control input terminal may not be operational as they may have been disconnected by the installer.
If both the key switch and keypad are connected to the energiser, then the last change will determine the result. For example, if the unit is armed via the keypad and then disarmed using the local key switch, it will disarm.
If in doubt consult your installer.
For a full description of operating the Keypad see section 8 .
Arming the Fence Using the Keypad

- Enter your PIN number (four digits long) and push the # key. (Default is 1 2 3 4)
- Make sure the red ARM light comes on.
- The keypad will beep twice to confirm that the system is armed.
- The fence will power up and if all is well (no faults) the system will be ready to deter and detect.
- If there is a fault on the fence and it cannot achieve full volt age, the LCD screen will indicate that there is a fault.
- To disarm the system, enter your PIN and press #.

© JVA Technologies Pty. Ltd.

5.5 Turning to Low Power Mode

To switch to Low Power mode, enter your PIN and press *41#. In Low Power mode the fence will still be powered and any breach will be detected, but the voltage will be much lower than normal operation. The ARM light will flash in Low Power mode.
Enter your PIN and press *42# to switch back to Full Power mode.
Alternatively, the unit can be switched to Low Power mode using a switch connected to control input 2 (gate), if it has been programmed accordingly.

5.6 When an Alarm Occurs

If the system is armed and the fence is tampered with, the Fence Light will flash and then remain on. A siren or strobe connected to the unit will turn on. If the energiser is connected to an alarm system for monitoring, an alarm signal will be sent to the alarm company monitoring the alarm system.
An alarm will also sound if the gate input is opened and the entry/exit delay time has elapsed.

5.7 To Silence the Alarm

- Enter your PIN and press #. This will silence the alarm but not disarm the system; the Armed Light will still be on. The sys tem will be ready for the next alarm.
  (Note that the following functions have an effect on alarm timing: Siren On time, Siren Off time, Siren Cycles, Auto Re-arm time).
- The siren and strobe are ready to respond again if triggered.
- To disarm the system, enter your PIN and press # again. This will also clear the fence alarm light.
- Alternatively, disarming using the key switch will reset the alarm.
- If you silence an alarm and the problem is still present when the unit is rearmed, the siren will sound again off time after

the programmed off time has elapsed.

5.8 Changing the PIN Number

- Enter the old PIN and press *0#. This enters User Program ming mode.
- Enter your new PIN (must be 4 digits) and then #. (Repeat to confirm PIN.)
- Press *# to exit User Programming mode.
- Make sure your new PIN works by using it to arm the ener giser.
- The default PIN is 1 2 3 4.

5.9 Standby Battery

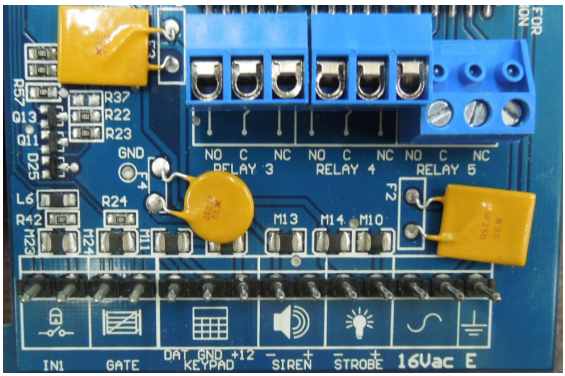
Should there be a loss of mains power, the Power Light on the key-pad will go off. If the loss of power is prolonged, the battery may discharge power and become ineffective. The Power Light will start to flash indicating a battery low power problem. If the battery is fully depleted, the unit will not pulse.
If the standby battery requires replacement, the Power Light will flash and the Status Light will flash three times.

5.10 Status Light

The energiser status light indicates that the energiser requires attention. See Section 6.2.

© JVA Technologies Pty. Ltd.

6 Technical Information



Low Voltage Terminals

LABEL	TYPE	DESCRIPTION
IN1	2 Way	Energiser control input 1 (dry contact normally open) internally wired in parallel with the key switch. Can be used for a remote switch or a radio receiver. The receiver may be powered from the keypad +12V terminal.
GATE	2 Way	Energiser control input 2 (dry contact). Default function is Gate input, normally closed. When the unit is armed and the gate is opened, it will trigger the Gate alarm. Alternatively, this input can be programmed to make the energiser alternate between Low Voltage and High Voltage mode.
KEYPAD	3 Way	Supplies power and data line for an external keypad. The +12 source on these terminals is protected with 1A self resetting fuse.
SIREN	2 Way	Switched 12V output. Low side switched. 30W max (including Siren). A buffer relay should be used when connecting these outputs to an alarm panel.

STROBE	2 Way	Switched 12V output. Low side switched. 30W max (including Strobe). A buffer relay should be used when connecting these outputs to an alarm panel.
16Vac	3 Way	16Vac 1.5A power input plus earth. Connection of the earth is only required where local safety or wiring codes demand it. This should be connected to the cabinet or mains earth NOT the fence earth.
Batt	2 Way	12V dc or battery connection via F1 (3 Amp resettable fuse) and flying leads.

6.1 Power Options

The Z14 has 2 sources of power, 16VAC and 12VDC (Battery). If using solar power and an external battery, connect the battery to the battery leads, not the 16Vac input.
A 24Vdc 1.5A supply can be used in place of the 16Vac supply. The correct connection is +24V to the mid AC pin, GND to the left AC pin. Due to the stored energy in a 24Vdc plug-pack, an AC Fail may take up to 5 minutes to be reported.
NOTE: Use only rechargeable batteries.

6.2 Status Codes

STATUS LIGHT NUMBER OF FLASHES	INTERPRETATION	CORRECTIVE ACTION
1	*Tamper detected*	*Fit the energiser lid or link J3*
2	*Mains supply fail*	*Restore mains power*
3	*Low battery, bad battery*	*Charge or replace battery*
4	*PCB service fault*	*Seek advice from your installer or distributor*

Status Codes

© JVA Technologies Pty. Ltd.

If a minor error occurs, it will self-clear if the error condition is removed. If the mains fail or the battery runs low, it will not disarm the energiser. However, without mains power, the battery will eventually be depleted and the energiser will attempt to maintain operation by entering Low Power mode after 4 warning beeps. If the battery charge continues to fall, the energiser will eventually stop. Once mains power has been restored and the battery has recovered, the energiser will rearm itself automatically after 4 warning beeps. A PCB fault will disarm the energiser. If an error disarms the energiser, the fence alarm will be activated.
If an error has momentarily caused the energiser to stop pulsing, this can be corrected by disarming and rearming the unit. Should the error recur return the unit for service.

6.3 Jumpers

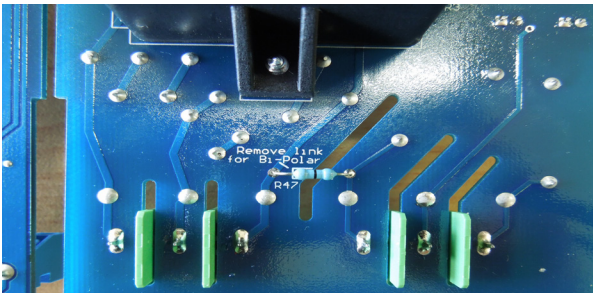
JUMPER	FUNCTION	PURPOSE
J3	*Inhibit Mains fail error.* *OR Tamper disable (Z14R and Z18 Mk2)*	*J3 is fitted to inhibit Mains fail errors if the intention is to operate the energiser on DC only (as in solar power systems).* *Disables the Infrared Tamper feature on the Z14R and Z18 Mk2.*
J4	*Factory default jumper* *Off to return programmable options to factory defaults on power up.*	*If the energiser needs to be defaulted to factory settings, remove all power (AC and battery) and remove the J4 jumper. Reapply the mains and the battery power. Reapply the J4 jumper and the Energiser will be reset to default settings.*

6.4 Configuring a Z14 to run in Bi-Polar mode

By default the Z14 is configured to run in standard mode. This procedure explains how to modify the Z14 so that it will run in Bi-Polar mode.

Step 1

On the back of the 7V42 Z14 PCB near the high voltage output terminals there is a link (Pictured below) which needs to be cut. Cut the link so that it is flush with the PCB at both points where it is soldered to prevent any arcing.



Step 2

Set Fence Mode (programming option 15) to bipolar.

Value	Function
0	Bi-Polar
1	Conventional

Z14 Programming Option 15

6.5 Tamper Circuit (Z14R, Z18 Mk2)

The tamper circuit serves two functions. It protects service personnel from receiving a shock by disarming the energiser when the lid is removed. It also sounds alarm if the lid is removed while the energiser is running. The tamper alarm can be inhibited by shorting the J3 pins together. It should be noted that in order for this function to work

© JVA Technologies Pty. Ltd.

the inside of the Energiser lid needs to have a small piece of reflective material above the IR tamper circuit.

7 Installation Programming Options

The Z14 has a non-volatile memory in which are held programming options (setup parameters). These are factory pre-set but can be field programmed using a keypad.

7.1 Programming Mode

To enter Programming mode, enter the 6-digit installer PIN followed by *0# keys. The keypad will beep twice to indicate that the command was accepted. If the PIN was incorrect, the keypad will beep 3 times.
Pressing the # key will cycle through all the options on the LCD.
NOTE: Not all option numbers are used. The default installer PIN is 0 1 2 3 4 5.

7.2 To Exit Programming Mode

After programming, press *# to exit. If left unattended, the unit will time out and auto exit Programming mode after approximately 5 minutes.

7.3 Changing the Installer PIN

The installer PIN may only be changed while in Programming mode. To enter a new installer pin, press 00 followed by the new 6-digit PIN, then the # key.
If you cannot remember your installer or user PIN, return the unit's memory to default. To do this, remove power (AC off and disconnect the battery), open the energiser, remove jumper J4 and reconnect the battery for about 10 seconds. Re-fit J4.

This will return all options to the factory set defaults.

7.4 Changing an Option

Most of the options have possible values in the range of 0 to 9.

To change any options, the unit must be in Programming mode. Check the option number (see table below) and then the table of values for that option. Then press the option number followed by the required value. When the programming is completed, exit from Programming mode. (See above)

For example, to change the power level to maximum, press 019#, and the keypad will beep twice to indicate that the command was successful.

7.5 Programming Options in Brief

See Section 7.6 for more detail.

OPTION	FUNCTION	DESCRIPTION
01	*Power Level*	*Sets the output voltage level*
02	*Low Power level*	*Sets the output power levels used in Low Power mode*
03	*Fence Alarm Voltage*	*Sets the voltage threshold below which the fence alarm will occur*
05	*Low Power Alarm Level*	*Sets the voltage threshold below which the fence alarm will occur in Low Power mode*
06	*Missed Pulse Count*	*Sets the number of pulses which may be missed before the alarm is activated*
07	*Battery Alarm Voltage*	*Sets the battery voltage threshold below which the general alarm will activate*

© JVA Technologies Pty. Ltd.

08	Siren On Time	Sets the time that the siren (and keypad beeper) will stay on after an alarm
09	Siren Off Time	The amount of time the siren will be off for after the On time has expired
10	Siren Cycles	The number of times the siren will sound for the On time function above. After this many cycles the siren will automatically mute
11	Input Inversion	Closed to arm or Open to arm
12	Gate Input Function	Gate Switch mode or Low Power Switch mode
13	Gate Exit Delay	Time from gate switch opening to alarm
14	Chime Mode	Allows the keypad and internal beeper function to be altered
16	Binary Options	Miscellaneous options
17	Anti-Bridging	If the voltage rises OR falls quickly by more than this setting as a percentage of the average fence voltage the alarm will occur
18	Binary Options 2	Miscellaneous options
20	Auto Re-arm Time	Sets the time which must elapse after an alarm has timed out (completed the siren cycles) before the unit will automatically re-arm, ready for the next alarm event.
21 - 25	Relay Options	To program the relay outputs to follow certain conditions of the energiser, for enhanced monitoring purposes
26	Group ID	Allows the energiser to be set as a Master or slave in a synchronised group. Not available in all markets.

Programming Options

7.6 Programming Options in Detail

NOTE: The bold panel in each table indicates the default value.

7.6.1 Power Level (01x#)

The power level option allows the shocking power of the fence to be adjusted. For example: To change the power level to maximum, enter the following:

0 1 9 # or 0 1 0 9 #

The keypad will beep twice to indicate that the new setting has been accepted. The actual fence voltage depends on the amount of fence wire and fence conditions.
This setting may affect the average power drain and therefore back-up battery time.

Value (x)	Voltage Conventional mode	Voltage Bi-Polar Mode
0	*5.0KV*	*2.5KV*
1	*5.5KV*	*2.8KV*
2	*6.0KV*	*3.0KV*
3	*6.5KV*	*3.3KV*
4	*7.0KV*	*3.5KV*
5	*7.5KV*	*3.8KV*
6	**8.0KV**	**4.0KV**
7	*8.5KV*	*4.3KV*
8	*9.0KV*	*4.5KV*
9	*9.5KV*	*4.5KV*

Power Level (01x#)

Note: In Bi-Polar mode the voltage on each polarity output is +/-2.5kV to +/-4.75kV i.e. half conventional mode voltage.

© JVA Technologies Pty. Ltd.

7.6.2 Low Power Level (02x#)

Same as above, but for Low Power mode.

Value (x)	Power
0	*0.5%*
1	*1.0%*
2	*1.5%*
3	*2.0%*
4	*2.5%*
5	*3.0%*
6	*3.5%*
7	*4.0%*
8	*4.5%*
9	*5.0%*

Low Power Level (02x#)

7.6.3 Fence Alarm Voltage (03x#)

This option sets the voltage threshold below which the fence alarm will occur. The default Fence Alarm Voltage is 4 kV in conventional mode and 3 KV in Bi-Polar mode. In Bi-Polar mode this threshold is for both positive and negative fence wires.

Value (x)	Voltage Conventional mode	Voltage Bi-Polar Mode
0	*1.5KV*	*1.5KV*
1	*2.0KV*	*1.8KV*
2	*2.5KV*	*2.1KV*
3	*3.0KV*	*2.4KV*
4	*3.5KV*	*2.7KV*
5	*4.0KV*	*3.0KV*

6	4.5KV	3.3KV
7	5.0KV	3.6KV
8	5.5KV	3.9KV
9	6.0KV	4.2KV

Fence Alarm Voltage (03x#)

7.6.4 Low Power Alarm Level (05x#)

This option sets the voltage threshold below which the fence alarm will occur. The default Fence Alarm Voltage is 500 Volts.

Value (x)	Voltage
0	300 Volts
1	500 Volts
2	700 Volts
3	900 Volts
4	1100 Volts

Low Power Alarm Level (05x#)

7.6.5 Missed Pulse Count (06x#)

This option enables the pulse count to be varied from the default (3). This is the number of bad or missing pulses that are counted before the alarm occurs.

NOTE: The lower this option is set, the more likely you are to get false alarms.

Value (x)	Missed Pulses
0	1
1	1
2	2
3	3
4	4

© JVA Technologies Pty. Ltd.

5	5
6	6
7	7
8	8
9	9

Missed Pulse Count (06x#)

7.6.6 Battery Alarm Voltage (07x#)

This option sets the battery voltage threshold below which the alarm will activate. The default Battery Alarm Voltage is 10.0 Volts and the unit will drop to low power at 9.0 Volts (after beeping 4 times).

If the unit enters Low Power mode due to a flat battery, the unit will automatically return to high voltage, without warning, when the mains voltage comes back on and the battery voltage rises.

Keypad number	Alarm	Reduce Power
0	9.0KV	8.0KV
1	9.5KV	8.5KV
2	10.0KV	9.0KV
3	10.5KV	9.5KV
4	11.0KV	10.0KV
5	11.5KV	10.5KV
6	12.0KV	11.0KV
7	12.5KV	11.5KV
8	13.0KV	12.0KV
9	13.5KV	12.5KV

Battery Alarm Voltage (07x#)

7.6.7 Siren On Time (08x#)

This option sets the duration of time that the siren will remain on after a fence alarm occurs. After this time the siren will turn off for the Siren Off Time indicated in Table 7.6.8. The siren will sound again if the alarm is still present after this Siren Off Time has passed.

The default is 3 minutes. This may be the subject of local regulations to stop an alarm causing undue disturbance to neighbours, etc.

NOTE: The Siren On Time will be cut short if the battery falls below the low battery level.

Value (x)	Time
0	*10 Seconds*
1	*30 Seconds*
2	*1 Minute*
3	*2 Minutes*
4	*3 Minutes*
5	*4 Minutes*
6	*5 Minutes*
7	*20 Minutes*
8	*45 Minutes*
9	*130 Minutes*

Siren On Time (08x#)

7.6.8 Siren Off time (09x#)

This option sets the amount of time the siren will be Off for after the Siren On Time above has expired. If an alarm is still present after this Off time, the siren will sound again.

© JVA Technologies Pty. Ltd.

Value (x)	Time
0	*10 Seconds*
1	*1 Minute*
2	*2 Minute*
3	*5 Minutes*
4	*10 Minutes*
5	*20 Minutes*
6	*30 Minutes*
7	*40 Minutes*
8	*50 Minutes*
9	*60 Minutes*

Siren Off Time (09x#)

7.6.9 Siren Cycles (10x#)

This option sets the maximum number of times the siren will sound for the "On time" if the alarm continues. This may be limited by local regulations to stop an alarm causing undue disturbance to neighbours, etc.

NOTE: This is the maximum number of cycles for 1 continuous alarm, intermittent alarm events could cause more than this number of siren soundings

Value (x)	Cycles
0	*1*
1	*1*
2	*2*
3	*3*
4	*4*
5	*5*
6	*6*

7	7
8	8
9	9

Siren Cycles (10x#)

7.6.10 Input Type (11x#)

The control inputs can be inverted. Unless an input is used for a Gate switch, in which case it is always NC.

Value (x)	Input type
0	NO Normally open
1	NC Normally Closed

Input Type (11x#)

7.6.11 Input 2 Function (12x#)

This option is used to set the function for the Control Input "Gate". If set to 0, the gate alarm will trigger if the gate is opened for longer than the Gate Entry/Exit Delay. If set to 1, the energiser will go into Low Power Mode if this input is closed.

Value (x)	Function
0	Gate
1	Low Power

Gate Input Function/Low Power Mode (12x#)

7.6.12 Gate Entry/Exit Delay (13x#)

The gate switch must remain open for longer than the Gate Entry/Exit Delay before the Gate Alarm is triggered. If the switch closes within this time, the Gate timer is reset to the Gate Entry/Exit Delay

© JVA Technologies Pty. Ltd.

Value.
Notes:
1. Setting 0 was changed from 10 seconds to 0 (immediate) in firmware version 7.77.
2. From version 7.92 on, Option 18 may be used to change this to a security panel style entry/exit delay.

Value (x)	Time
0	*0 Seconds (immediate)*
1	*30 Seconds*
2	*1 Minute*
3	*2 Minutes*
4	*3 Minutes*
5	*4 Minutes*
6	*5 Minutes*
7	*6 Minutes*
8	*7 Minutes*
9	*8 Minutes*

Gate Entry/Exit Delay (13x#)

7.6.13 Chime Mode (14x#)

This option allows the energiser internal and keypad beeper to be used as a door chime for the gate switch. When set to None, the keypad beeper is used to indicate correct keypad operation only. When set to Door Chime mode, the beepers will sound when the gate switch opens, even if the energiser is disarmed. Note "Gate" must be selected in 7.6.11 Input 2 Function (Option 12).If set to Siren, the beepers mimic the siren function.

Gate Beeps plus Siren will give 2 beeps on Gate open and 4 on close, plus continuous for an alarm. Beeps are on Keypad only, not internal beeper.

Value (x)	Function
0	*None*
1	*Door Chime*
2	*Siren*
3	*Fence Alarm*
4	*Gate beeps plus Siren*

Chime Mode (14x#)

7.6.14 Binary Options (16x#)

Each option in this table can be turned on by adding the corresponding value.

For option + 1 set 16 to 01, for + 1 and +2 set 16 to 03.

+1: Enable cross coupled alarm, not used on Z series Energisers.

+2: Maximum power at all times. Note turning this option on may remove IEC standards compliance. Added in code version 7.80.

+4: Limits outputs to 2.5 Joules per Zone on a Z28. Added in code version 7.84. Also limits a Z14 to 2.5J per zone in group mode. Added 7.86.

+8: Enables the IR tamper detection under the lid. J3 changes function to inhibit tamper.

+16: Stop slaves on E-16 (Coms Fail) if the communications from the group master is lost.

+32: Stops the energiser sending Alarm Memory to a PC, relay PCB or keypad. Set this to restore "unlatched" mode on a PAE201 relay PCB.

Note: +8 and +16 added in code version 7.86. +32 added in code version 7.87.

Value (x)	Function
0	*None*
+1	*Cross couple alarm*
+2	*Max Power*
+4	*2.5 Joules Limit*

© JVA Technologies Pty. Ltd.

+8	*IR Tamper enabled*
+16	*Stop slave on coms fail*
+32	*Do not send Alarm memory*

Binary Options (16x#)

7.6.15 Anti-Bridging threshold (17x#)

Anti-bridging has been designed to detect a section of fence being bypassed, and removed from circuit, by an intruder bridging the feed to returns together and then cutting the live wires in between. Setting this option to a value greater than 0 (default is 0 = off) will enable Anti-bridging, however this feature will not operate in low power mode! While Armed, a Fence Alarm will trigger if the Fence Voltage rises OR falls quickly by more than the threshold. A slow change to the voltage will not trigger a Fence Alarm until the Voltage is less than the Fence Alarm Voltage (03x#).

The Anti-bridging Threshold is a percentage value of the current Fence Voltage. For Example, setting option 17 to 10 (1710#) will set a 10% Anti-bridging Threshold. At this level a fence (return) voltage normally reading 7.5kV will trigger a Fence Alarm if the voltage quickly rises to over 8.3kV or falls to less than 6.7kV.

NOTES:

1. Power Level (Option 1) must be set higher than the normal fence running voltage, otherwise if the load is released (fence bridged) voltage control will limit the voltage rise and the anti-bridging alarm would not activate. For the above example, Option 1 must be set to 7 or greater to allow the un-loaded fence to rise to 8.3kV or higher, thus triggering the Alarm.

2. A minimum of 5% was added in code version 7.92.

7.6.16 Binary Options 2 (18x#)

Each option in this table can be turned on by adding the corresponding value.

Each option in this table can be turned on by adding the corresponding value.
For option+ 1 set 18 to 01, for + 1 and +2 set to 03.
+1: Enable Siren Acknowledge. The siren will chirp once for armed and twice for disarmed.
+2: Enables a home alarm style entry/exit delay for the gate input. See also option 13.
+4: Sets the keypad bus baud rate to 4800 (default is 2400), all units in a group, PC and Keypad must be set to the same baud rate. The change will not take effect until after a reset.
+8: Sets the keypad bus baud rate to 9600 (default is 2400)
Note: Z11 defaults to +1.
Note: +2, +4 and +8 were added in code version 7v92.

Value (x)	Function
0	*None*
+1	*Siren codes*
+2	*Gate delay type*
+4	*4800 baud*
+8	*9600 baud*
+16	
+32	

Binary Options 2 (18x#)

7.6.17 Auto Re-arm Time (20x#)

This option sets the time which must elapse before another alarm will sound after the first alarm has timed out (gone completely through its cycles without being turned off).
If an event occurs (such as a low fence voltage) which triggers the siren, any other events which would otherwise trigger the siren (such as a gate alarm) will be ignored while the siren is sounding and until after the Auto Re-arm time has passed.

© JVA Technologies Pty. Ltd.

A setting of 0 will disable Auto Re-arm.
If this time is set to less than the Siren Off Time, the Energiser may re-arm in the "Off" time and the number of Siren Cycles will be reduced.
Setting 0 was changed to immediate in version 7.77.

Value (x)	Time
0	*0 Seconds (Immediate)*
1	*30 Seconds*
2	*1 Minute*
3	*2 Minutes*
4	*3 Minutes*
5	*4 Minutes*
6	*5 Minutes*
7	*6 Minutes*
8	*7 Minutes*
9	*Disabled – Do not auto rearm*

Auto Re-Arm Time Values for Firmware 7.77 and above (20x#)

Value (x)	OLD Time
0	*Do not re-arm*
1	*30 Seconds*
2	*1 Minute*
3	*2 Minutes*
4	*3 Minutes*
5	*4 Minutes*
6	*5 Minutes*
7	*6 Minutes*

8	*7 Minutes*
9	*8 Minutes*

Auto Re-Arm Time Values
before Firmware 7.77 (20x#)

7.6.18 Relay Functions

All relays can be set to any of the available functions (user assignable).

Relay 1 is (21x#)
Relay 2 is (22x#), etc.

Even though the three additional relays are not fitted to the Z14, Relays 3, 4
and 5 can still be programmed. This means that if the relays are retrofitted to the circuit board they will function. The modes are explained in the table opposite.

The defaults for the Z14 are:

- Relay 1 – Siren (12V switched output)
- Relay 2 – Strobe (12V switched output)
- Relay 3 – Fence 1 (Note: Relay 3 is not physically fitted to PCB)
- Relay 4 – Armed 1 (Note: Relay 4 is not physically fitted to PCB)
- Relay 5 – General (Note: Relay 5 is not physically fitted to PCB)

NOTE: Optional extra relays can be retro-fitted. Contact your nearest JVA service centre for details.

Value (x)	Mode
0	*Fence 1*
1	*Fence 1 or off*
2	*Armed 1*
3	*Fence 2*
4	*Fence 2 or off*
5	*Armed 2*

© JVA Technologies Pty. Ltd.

6	*Fence Bi-Polar*
7	*General*
8	*Siren*
9	*Strobe*
10	*AC Fail*
11	*Low / Bad Battery*
12	*Tamper*
13	*Strobe 2*
14	*Gate 1 or 2*
15	*Siren caused by Gate 1 or 2*
16	*Armed in Low Power Mode*
17	*Group Armed Note 2*
18	*Group General*

Notes:

1. The siren and strobe switched 12V outputs can be used to drive external buffer relays.
2. Group relay functions are only operable on the group master

Function	*Logic for alarm state (opposite of normal state)*
Fence x	*Fence x Alarm: Zone x is Armed (Pulsing) AND the Fence Return Voltage has fallen below the Fence Alarm Voltage for more pulses than the Missed Pulse Count. Not latched.*
Fence x alarm or off	*Zone x is Off OR the Fence Return Voltage has fallen below the Fence Alarm Voltage for more pulses than the Missed Pulse Count. Not Latched.*

Fence Bi-polar	*Energiser is Armed (Pulsing) AND the Fence Return Voltages on either Bi-polar return line has fallen below the Fence Alarm Voltage for more pulses than the Missed Pulse Count. Not latched.*
Armed x	*Zone x is Armed (Pulsing)*
General	*AC Fail OR Tamper OR Low Battery OR Gate Alarm OR Internal Error. Latched for internal errors only.*
Siren	*Fence Alarm 1 OR Fence Alarm 2 OR Gate Or Tamper, will time out after the Siren Time Out time. This function is latched.*
Strobe	*As per Siren but does not time out, will remain On until both Zones are switched off. This function is latched.*
AC Fail	*Alarm on AC Fail*
Battery	*Alarm on low or bad battery*
Tamper	*Alarm when the lid is up and J3 is not fitted*
Group wide x	*Group relay functions are the collected status of the whole group of Z energisers. Group Armed for example is set only if all energisers in the group are armed.*

Relay Options Explained

7.6.19 Group Mode (26x#)

A group must have only one master. The other Energisers in the group are slaves. Group Voltage display energisers require each slave to have a different number. Since the keypad bus is common among the group one keypad can be used to program all units for all options except this Group Mode (for obvious reasons).

The procedure is:

- *Connect the keypad to each unit in turn, before linking all Energisers into a group.*
- *Set the option: one unit as master the other as slaves.*

NOTE: At this time groups are limited to a master and 14 slaves.
In some markets Group Mode may not be available.

For details on group wiring and operation see APPENDIX A.

© JVA Technologies Pty. Ltd.

Value (x)	Mode
0	*No Group*
1	*Master*
2	*Slave 1*
3	*Slave 2*
4	*Slave 3*
5	*Slave 4*
6	*Slave 5*
7	*Slave 6*
etc	*etc*
15	*Slave 14*

Group Mode (26x#)

8 JVA Z14 LCD Keypad Features

8.1 Keypad status LEDs

The LCD keypad has two LEDs, Power and Arm, which act as follows:

- Power: On with Mains power, flashes on low battery.
- Arm: On When the energiser is armed (pulsing), flashes when in Low Power Mode.

© JVA Technologies Pty. Ltd.

8.1.1 Arming/Disarming the Fence Using the Keypad

Enter your User PIN (Personal Identification Number: four digits long) and push the # key. Make sure the red ARM light comes on and the keypad beeps twice to confirm that the system is armed.
The fence will power up and if all is well (no faults) the system will be ready to deter and detect.
To disarm the system enter your User PIN and press #.
Note: If there is an alarm sounding you will need to enter your PIN twice, once to silence the alarm and once more to disarm.

8.1.2 Menus

The Z series keypad has an optional menu driven interface. The main menu is accessed by pressing the Menu (Bypass) key (bottom right). You will be asked to enter your PIN, and then press #.
Most functions are available via the menus. Use the 2 key to go up and the 8 to step down through a menu. The Enter (#) key is used to select the current line.
The menu will time out after a few minutes and return to the normal status display.
The menu system was added in keypad code version 2.10

8.1.3 Keypad Status Display

In normal operation the keypad shows a continuous summary of the system status. For example if the system is disarmed the keypad will display "Ready to Arm".
If the system is armed then the keypad will display the voltages for each zone in the system.
Since there can be many things to display the keypad automatically "scrolls" through all relevant detail. Each screen is show for about 2 seconds. If you wish to hold the display at a particular point simple press the [#] key. The auto scrolling will stop for about 20 seconds.
Pressing the [#] key again will advance the display one step.
If a new trouble (AC fail, low battery etc) or alarm occurs, the keypad

screen will jump to the relevant zone, the keypad will beep (unless toggled off) and auto scrolling will cease for about 3 minutes.

8.1.4 Changing the Keypad Messages and Address

You can change the messages and each of the zone labels.

- The Dealer Message displays when the system is on standby.
- Zone Labels displays after the [#] key is pressed during alarm memory or faults.
- The programmable Service Message is displayed during AC failure, communication failure, or low battery.

[1]	[2] Character up	[3] not used	Emergency not used
[4] Cursor left	[5] Next Message	[6] Cursor right	Fire not used
[7]	[8] Character down	[9]	Panic not used
[*]	[0] Last Message	[#] Enter/ Exit	Bypass not used

Keys used for changing messages

- To activate the keypad programming mode, enter the [Installer's Code] [*] [0][1] [#]. Information may be entered into the keypad in the form of letters (upper and lower case), numbers (0–9), and 22 special symbols. All characters are displayed in the order: upper and lower case letters, numbers, and special symbols. The [Space] character precedes the letter A.

- To enter a Label, use the [2] key to scroll through the characters until you reach the desired character. If you scroll past the desired character, the [8] key may be used to scroll backwards. NOTE: The space character is before the A character (When A is displayed, press [8] to get a space).

© JVA Technologies Pty. Ltd.

- When the desired character is displayed, press the [6] key to move the cursor to the next character position. The [4] key moves the cursor to the left.
- When all characters have been entered, press the [#] key to enter the message and move to the next message position.
- Use the [0] key to move backward through the messages.

NOTE: If you move to the next message using [5] instead of the [#] key you will lose any changes you made!
To change the keypad address, scroll through the messages until the keypad displays: "Keypad address __" then change the value by pressing [2] (up) or [8] (down). Validate by pressing [#].

The message order is:
- SERVICE MESSAGE (Displayed under "System Trouble") - Press "#"
- DEALER MESSAGE (Displayed under the standby message: "Ready to Arm")
- ZONE NAMES
- BAUD RATE (should be left at 2400)
- KEYPAD ADDRESS ((should be left at 1)

8.2 To Exit Keypad Programming

When you have finished programming, press [*] [#].
NOTE: The keypad will also exit the programming mode if you do not press any key within a five minute period.
To return the Keypad to default settings press the emergency button during power up. This feature was added in keypad firmware version 1.2.

8.3 Connecting Multiple Keypads to a system

Up to three keypads may be used to remotely monitor and control the Z series security energisers.

To operate correctly, each Keypad must be configured to use a unique KEYPAD ADDRESS. This is best achieved by connecting one keypad (at a time) to the Master Energiser and updating the KEYPAD ADDRESS. Once all Keypads have a different address, all can be connected to the system. A recommendation is that one Keypad is kept at ADDRESS 1.
The Energiser now needs to be introduced to all of these Keypads. This is achieved by resetting the Energiser using the Keypad (configured to ADDRESS 1), by pressing [USER PIN]*68#. Alternately the power can also be removed to reset the Energiser. After a reset, the Energiser will determine what Keypads are connected, and only these ADDRESSES will be used in the future. This prevents un-authorised Keypads being added to the system once it is running.

If the security system is to use a PC based interface such as Perimeter Patrol, KEYPAD ADDRESS 2 should not be used by a keypad. The PC software uses this address to control the Energisers.

8.4 Notes Regarding Keypad Configuration

Zone 1 (the master) must be connected to the group. If it is not connected the other energisers in the group will not send status packets to the keypad. The status packets contain voltage and alarm information which the keypad displays. If Zone 1 is not connected, the keypad will report a communications failure with all the zones.

A Slave Energiser disconnected from the Group will only talk to a Keypad if it has a KEYPAD ADDRESS of 1. When adding/removing an energiser to/from the group, be sure to re-analyse the group using the key sequence *68#. Zone 1 (the master) must be connected to the group for this operation to work.

When re-analysing a group ensure all energisers are disarmed. If they are not, this function will not work properly.

© JVA Technologies Pty. Ltd.

*Note: If the group ID has recently been changed you may need to reset ([PIN]*68#) before the new ID's will be properly reported to the keypad.*

8.5 Calibrating the voltage display

The PCB's will be factory calibrated and should not require adjustment for the life of the product. If, however, certain components are replaced during repair the Energiser may need recalibration. This includes the main processor chip.

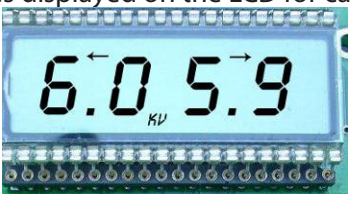
Procedure:

1. On the energiser Fence connectors, connect Return to Feed terminals and Earth (Return) to Earth (Feed) terminals.
2. Plug in the keypad, power the unit and turn on the energiser using the key-switch.

Clearing old calibration using the keypad:

3.	Type [Installer's Code] [*][0][#]	Enter programming mode
4.	Type [9][8][0][0]#	Clear the calibration for the Left value
5.	Type [9][9][0][0]#	Clear the calibration for the Right value
6.	Type [*] [#].	Exit programming mode

7. Once the calibration is cleared, run the energiser and record the actual voltages produced by the energiser using a fence meter. Record the values displayed on the LCD. The actual voltages must be higher than the values displayed on the LCD for calibration to work.



Left value	*Right value*
(Feed for Z14 standard/Z18)	*(Feed for Z14 standard/Z18)*
(Return2 for Z14 All live/Z28)	*(Return2 for Z14 All live/Z28)*

8. Calculate the return calibration factor = (Actual Voltage / Displayed voltage *100) – 100

For example If after clearing the calibration the Actual fence voltage is 7.1 but the display left value reads 6.0 (as per the picture above) the factor is:

7.1 / 6= 1.183
*1.183 *100 = 118.3*
118.3 - 100 = 18.3 round up to 18
For the Left value, the factor to enter is 18 (an increase of 18 percent).
Using the same process for the Right value (above picture shows 5.9kV),
For the right value, the factor to enter would be 20.

Entering new calibrations using the keypad (for our example)

9.	Type [Installer's Code] [*] [0] [#]	Enter programming mode
10.	Type [9][8][1][8][#]	Enter the Left calibration
11.	Type [9][9][2][0][#]	Enter the Right calibration
12.	Type [*] [#].	Exit programming mode

Note. In version 7V80 the range of calibration was increased to 199.

© JVA Technologies Pty. Ltd.

8.6 Summary of LCD Keypad Functions

Function	Key Sequence
Arm/Disarm	[User PIN][#]
Silence an alarm (Single zone system only)	[User PIN][#]
Start Programming the Z series energiser	[Installer PIN][*] [0] [#]
Start Programming the Keypad	[Installer PIN][*] [0] [1] [#]
Exit Programming (any mode)	[*] [#]
Change a User PIN, 4 Digits	[User PIN][*]0[#][New PIN]#
Change the Installer PIN, 5 Digits	[0] [0] [New Installer PIN][#] Note 1
Arm All Zones (Multi-zone groups)	[User PIN][*][1][0][#] Note 2
Arm Zone 1 (Master)	[User PIN][*][1][1][#]
Arm Zone x, where x is any zone number up to 15	[User PIN][*][1][x][#]
Disarm All Zones	[User PIN][*][2][0][#]
Disarm Zone 1 or Master	[User PIN][*][2][1][#]
Disarm Zone x, where x is any zone number up to 15	[User PIN][*][2][x][#]
Switch to low power mode (all zones)	[User PIN][*][4][1][#]
Switch to high power mode (all zones)	[User PIN][*][4][2][#]
Arm Gate circuits only	[User PIN][*][4][#] Note 6
To change the Keypad Messages to English	[*][3][1][#]
To change the Keypad Messages to Spanish	[*][3][2][#] (not well supported yet)
Keypad Audible Feedback On/Off	[*] [5] [1] [#]

Keypad alarm beeper (Chime) On/Off	[*] [5] [3] [#]
Keypad Error Tones On/Off	[*] [5] [4] [#]
Backlight mode On/On with keys/Off	[*] [8] [#]
Display Keypad Model	[*] [9] [#]
Re-analyse the group	[*][6][8][#]
Reset and Display firmware version number	[User PIN][*][6][8][#] Note 3
Reset and return to factory defaults	[Installer PIN][*] [6] [8] [#] Note 5
Power Boost	[*] [9] [9] [#] Note 3
Siren test	[*] [6] [3] [#] Note 3
Battery test	[*] [6] [4] [#] Note 3
Clear Alarm memory	[*] [1] [#] Note 4

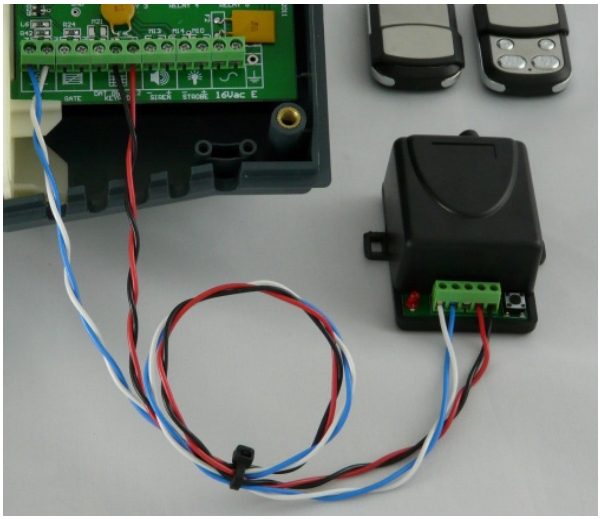
Notes:

1. *Operates while in programming mode only.*
2. *The group arm and disarm codes were added in version 7.5 of the firware.*
3. *Added in firmware version 7.69 , Battery test will only operate while the Energisers is disarmed.*
4. *Added in firmware version 7.77*
5. *Added version 7.86*
6. *Added version 7.89*

© JVA Technologies Pty. Ltd.

9 Remote Control Unit

The Remote Control Unit provides the Z14 with the ability to arm or disarm the energiser via a compact key chain fob remote control.
Two remote controls are provided, and are uniquely coupled to the receiver using a rolling code algorithm to ensure security. Should one or both remote controls lose synchronisation with the receiver, it is a simple procedure to re-associate the remotes.
The receiver controls the energiser by IN1 and receives power from the Keypad bus. The output of the remote control receiver is a normally open (NO) contact.
The remote controls have a range of up to 100 metres. They come fitted with a LR27A 12V battery that will provide up to 2 years service.



Remote Control Unit Receiver

9.1 Features

- Enables arm / disarm of the energiser, or a single zone, by key chain fob remote control

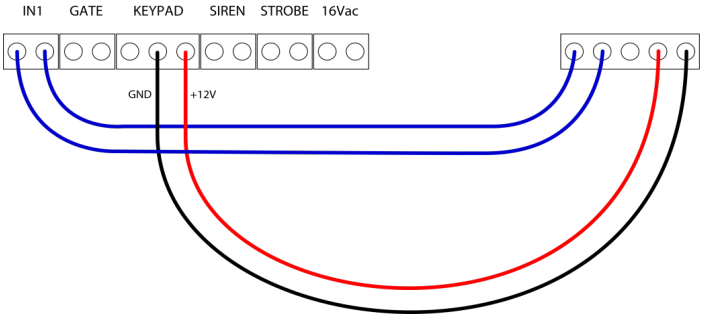
- 2 remote controls included
- Uses digital rolling-code algorithm to uniquely and securely couple to remote controls
- Operates between 315 – 433.92MHz
- 100 metres range
- Easily connected and configured
- Wire to keypad bus (for power) and input (usually IN1)

9.2 Installation

The Remote control receiver unit requires 12V and 0V (GND) from the keypad bus, and its output is shown wired to IN1.
Mount the receiver on the right hand side of the Z14 energiser. Connect +12V and 0V (GND) from the KEYPAD terminals on the energiser to the right-most terminals of the receiver, as per the diagram above. Connect the IN1 terminals to the left-most terminals of the receiver. Keep all connections away from any high voltage wiring, specifically the Fence Feed connections coming from the left side of the energiser.

Z11 Low Voltage Connector Block

Remote Control Reciever Conenctor Block



Remote Control Receiver Wiring Diagram

© JVA Technologies Pty. Ltd.

9.3 Operation and configuration

The remote controls come pre-configured to work with the receiver. Simply press the LOCK key to arm the energiser. Press the UNLOCK key to disarm.
Should a remote control become lost or stolen, it is possible to disassociate the receiver with all remotes. To do this, press the button on the bottom right corner of the receiver unit and hold for approximately 10 seconds. When the red light goes off the receiver has wiped all associated remote controls from its memory.
To associate a remote control, press the button on the receiver once. The light will come on momentarily. Next, press a button on the desired remote control. The receiver light will begin flashing. Press the button on the receiver and the light will stop flashing. Test the remote control by pressing a button. The receiver light will flash, indicating it has successfully associated with the remote control. Repeat these steps for any remaining remote controls that require (re) association.

10 Standard Requirements for Security Electric Fences

10.1 Definitions

Connecting lead
An electric conductor, used to connect the **energiser** to the **electric fence** or the earth **electrode**

Electric animal fence
An **electric fence** used to contain animals within or exclude animals from a particular area

Electric fence
A barrier which includes one or more electric conductors, insulated

from earth, to which electric pulses are applied by an **energiser**

Electric security fence
A fence used for security purposes which comprises an **electric fence** and a physical barrier electrically isolated from the **electric fence**

10.2 General requirements for electric fences

1. **Electric fences** shall be installed and operated so that they cause no electrical hazard to persons, animals or their surroundings.
2. **Electric fence** constructions which are likely to lead to the entanglement of animals or persons shall be avoided.
3. INSTALLERS/USERS SHOULD NOTE: WARNING: Avoid contacting electric fence wires especially with the head, neck or torso. Do not climb over, through or under a multi-wire electric fence. Use a gate or a specially designed crossing point.
4. An **electric fence** shall not be supplied from two different energisers or from independent fence circuits of the same energiser. For any two different electric fences, each supplied from a different energiser independently timed, the distance between the wires of the two electric fences shall be at least 2.5 m. If this gap is to be closed, this shall be affected by means of electrically non-conductive material or an isolated metal barrier.
5. Barbed wire or razor wire shall not be electrified by an **energiser.**
6. Any part of an **electric fence** which is installed along a public road or pathway shall be identified at frequent intervals by warning plates securely fastened to the fence posts or firmly clamped to the fence wires.

1. The size of the warning plates shall be at least 100 mm x 200 mm.
2. The background colour of both sides of the warning plate shall be yellow. The colour on the plate shall be black and shall be either:

© JVA Technologies Pty. Ltd.

The symbol of figure 7, or

The substance of "Caution - ELECTRIC FENCE".

3. The inscription shall be indelible, inscribed on both sides of the warning plate and have a height of at least 25 mm.

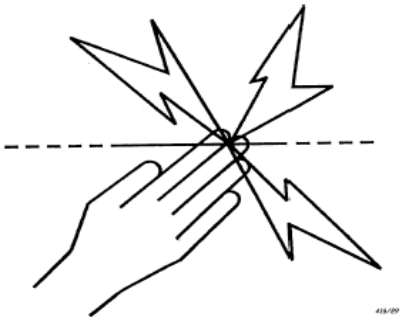


Figure 7 – Warning plate symbol

7. The energiser earth **electrode** shall penetrate the ground to a depth of at least 1 m.

8. **Connecting leads** that are run inside buildings shall be effectively insulated from the earthed structural parts of the building. This may be achieved by using insulated high voltage cable.

9. **Connecting leads** that are run underground shall be run in a conduit of insulating material or else insulated high voltage cable shall be used. Care shall be taken to avoid damage to the connecting leads due to the effects of animal hooves or tractor wheels sinking into the ground.

10. **Connecting leads** shall not be installed in the same conduit as the mains supply wiring, communicating cables or data cables.

11. **Connecting leads** and electric fence wires shall not cross above overhead power or communication lines.

12. Crossings with overhead power lines shall be avoided wherever possible. If such a crossing cannot be avoided, it shall be made underneath the power line and as nearly as possible at right angles to it.

13. If **connecting leads** and **electric fence** wires are installed near an overhead power line, the clearances shall be not less than those shown in table.

Power line voltage V	*Clearance m*
<=1 000	*3*
>1 000 <=33 000	*4*
>33 000	*8*

Minimum Clearances from Power Lines

14. If **connecting leads** and **electric fence** wires are installed near an overhead power line, their height above the ground shall not exceed 2 m. This height applies either side of the orthogonal projection of the outermost conductors of the power line on the ground surface, for a distance of

- 2 m for power lines operating at a nominal voltage not exceeding 1,000 V
- 15 m for power lines operating at a nominal voltage exceeding 1,000 V.

10.3 Particular requirements for electric animal fences in Australia

15. A distance of at least 10 m shall be maintained between the **energiser earth electrode** and any other earthing system such as the power supply system protective earth or the telecommunication system earth.

16. **Electric fences** intended for deterring birds, household pet containment or training animals such as cows need only be supplied from low output **energisers** to obtain satisfactory and safe performance.

17. In **electric fences** intended for deterring birds from roosting on buildings, no **electric fence** wire shall be connected to the **energiser earth electrode**. A warning plate, as described above, shall be fitted to every point where persons may gain ready access to the

© JVA Technologies Pty. Ltd.

conductors.

18. A non-electrified fence incorporating barbed wire or razor wire may be used to support one or more off-set electrified wires of an **electric animal fence**. The supporting devices for the electrified wires shall be constructed so as to ensure that these wires are positioned at a minimum distance of 150 mm from the vertical plane of the non-electrified wires. The barbed wire and razor wire shall be earthed at regular intervals.

19. Where an **electric animal fence** crosses a public pathway, a non-electrified gate shall be incorporated in the **electric fence** at the point or a crossing by means of stiles shall be provided. At any such crossing, the adjacent electrified wires shall carry warning plates as described above.

10.4 Installation of electric security fences

10.4.1 General

An electric security fence should be installed so that, under normal conditions of operation, persons are protected against inadvertent contact with pulsed conductors.

Note 1: This requirement is primarily intended to establish that a desirable level of safety is present or is being maintained in the physical barrier.

Note 2: When selecting the type of physical barrier, the likely presence of young children should be a factor in considering the size of openings.

10.4.2 Location of electric security fence

The electric fence should be separated from the public access area by means of a physical barrier.

Where an electric fence is installed in an elevated position, such as

on the inner side of a window or skylight, the physical barrier may be less than 1.5 m high where it covers the whole of the electric fence. If the bottom of the window or skylight is within a distance of 1.5 m from the floor or access level then the physical barrier need only extend up to a height of 1.5 m above the floor or access level.

10.4.3 Prohibited zone for pulsed conductors

Pulsed conductors shall not be installed within the shaded zone shown in Figure 8.

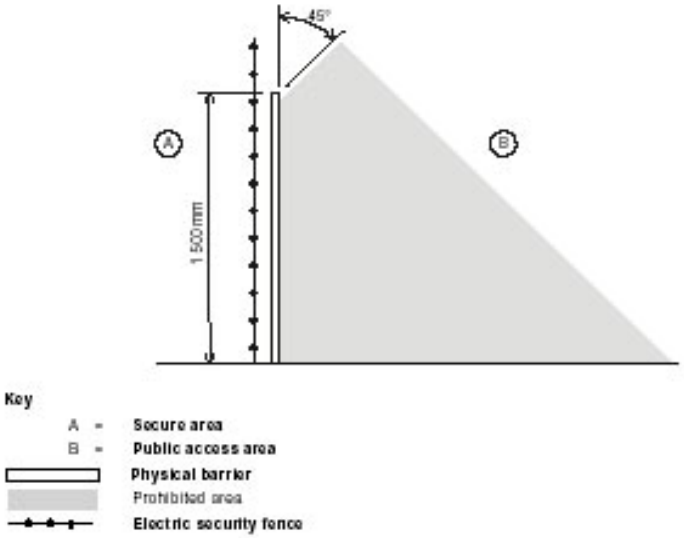


Figure 8 – Prohibited Area for Pulse Conductors

Note 1: Where an electric security fence is planned to run close to a site boundary, the relevant government authority should be consulted before installation begins.

© JVA Technologies Pty. Ltd.

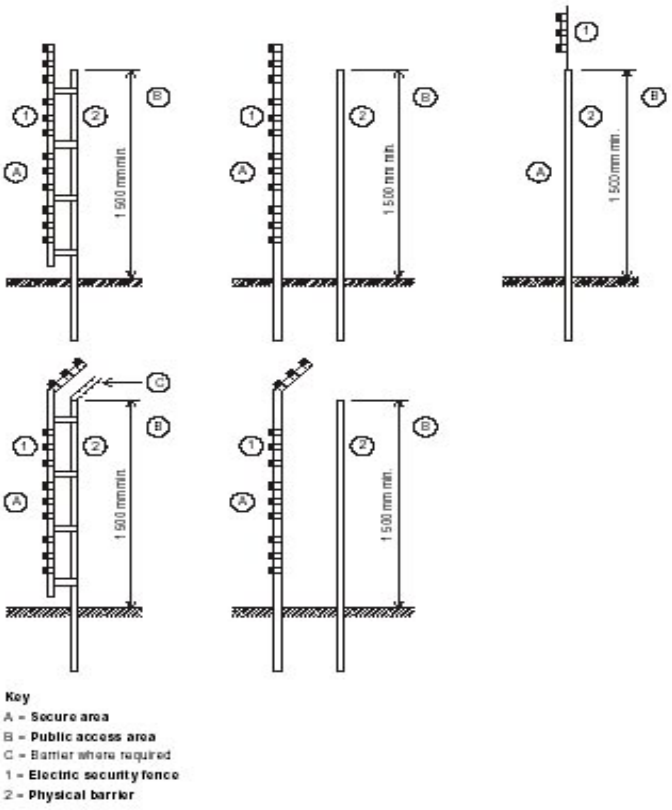
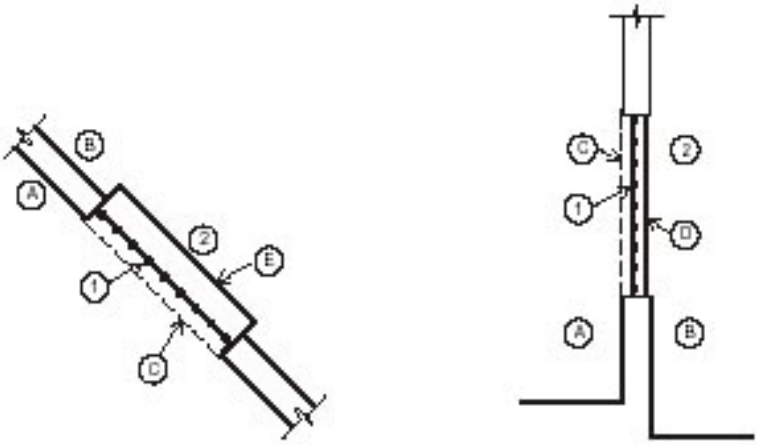


Figure 9 – Typical Constructions where an Electric Security Fence is Exposed to the Public

Note 2: Typical electric security fence installations are shown in Figure 9 and Figure 10.



Key

A = **Secure area**
B = **Public access area**
C = Barrier where required
D = Glass window pane
E = Skylight in roof
1 = **Electric security fence**
2 = **Physical barrier**

Figure 10 – Typical fence constructions where the electric security fence is installed in windows and skylights

10.4.4 Separation between electric fence and physical barrier

Where a physical barrier is installed in compliance with 3 at least one dimension in any opening should be not greater than 130 mm and the separation between the electric fence and the physical barrier should be

© JVA Technologies Pty. Ltd.

- within the range of 100 mm to 200 mm or greater than 1 000 mm where at least one dimension in each opening in the physical barrier is not greater than 130 mm;

- greater than 1 000 mm where any opening in the physical barrier has all dimensions greater than 50 mm;

- less than 200 mm or greater than 1 000 mm where the physical barrier does not have any openings.

Note 1: These restrictions are intended to reduce the possibility of persons making inadvertent contact with the pulsed conductors and to prevent them from becoming wedged between the electric fence and the physical barrier, thereby being exposed to multiple shocks from the energiser.

Note 2: The separation is the perpendicular distance between the electric fence and the physical barrier.

10.4.5 Prohibited mounting

Electric fence conductors should not be mounted on a support used for any overhead power line.

10.4.6 Operation of electric security fence

The conductors of an electric fence should not be energized unless all authorized persons, within or entering the secure area, have been informed of its location.

Where there is a risk of persons being injured by a secondary cause, appropriate additional safety precautions should be taken.

Note: An example of a secondary cause is where a person may be expected to fall from a surface if contact is made with pulsed conductors.

APPENDIX A: GROUP SIMULTANEOUS PULSE FEATURE

Group Simultaneous Pulse Feature

In some Industrial Installations it may be preferable to provide the ability to link multiple Energisers into a group. When linked the individual Z Series Energisers become a "Group". Members of a group have simultaneous high voltage output pulses and act as is they are one energiser with multiple outputs. This is designed so that no possible combination of individual outputs can be dangerous.

Group Mode Programming (26x#)

A group MUST have only 1 master. The other Energisers in the group are slaves.

For the Z14R Energisers, if there is no Master, a Slave will display Error 4 on the Status LED when Armed and it will not electrify the fence. This is a requirement for Australian Standards.

For every other Z-series Energisers, if there is no Master, each Slave will electrify the fence (pulses) when Armed. However, the simultaneous pulse feature will NOT be operating.

***Note1**: Do not interconnect the energisers via the keypad bus until after they are programmed.*

***Note2**: If more than one keypad is used, they will need different addresses (see 8.1.4: Changing the keypad Messages and Address).*

***Note3**: If Perimeter Patrol is used any keypad in the system should not have address 2, (see 8.1.4: Changing the keypad Messages and Address).*

For all Energisers that will be part of a group, the procedure is as follows:

1. Make sure the key switch is turned off and IN1 isn't shorted

© JVA Technologies Pty. Ltd.

(note that the Z14R does not have a key switch).

2. Connect the battery.
3. On the keypad, enter [Installer's code] [*] [0] [#].
4. Enter [26] followed by the required value (e.g. [1] for master) then [#].
5. Enter [*] [#] to exit programming.
6. Connect the group using the keypad bus as the Group Mode Linking diagram.

Note1*: At this time groups are limited to a master and 14 slaves (15 zones total)*

Value (x)	Mode
0	*No Group*
1	*Master*
2	*Slave 1*
3	*Slave 2*
4	*Slave 3*
5	*Slave 4*
6	*Slave 5*
7	*Slave 6*
8	*Slave 7*
9	*Slave 8*
10	*Slave 9*
11	*Slave 10*
12	*Slave 11*
13	*Slave 12*
14	*Slave 13*
15	*Slave 14*

Group linking via the Keypad "bus"

The keypad terminals on all Energisers in the group are linked, see Figure 16. Since only one Energiser needs to power the keypad, 3 wires are linked from one Energiser (preferably the Master) to the keypad (optional) and 2 wires to every other Energiser in the group. Do not connect the + lines between Energisers as this could result in some strange behaviour and possibly damage. Note the connections can be a star or daisy chain or any mixture. It is possible for a PC to be added to the group using a keypad to RS232 adaptor (PAE051).

We recommend following these steps in the right order:

a. Disarm all energisers in the group. If energisers are not disarmed Step 10 may not work correctly.

b. Program the keypad address using one of the energisers.

c. Program each energiser with its required address (Master address=1, Slave 1 address=2...). Refer to note 4 below.

d. Connect any control/monitoring unit 12V, GND and Data to the Group Master

e. Connect all the slaves Data and GND to the Group Master.

f. Connect the battery and AC power of the Group Master but do not arm.

g. Connect the battery and AC power of each slave Note: Do not arm them until all the Energisers in the group are connected.

h. Wait 5 minutes for all the Energisers to synchronise with the Master

i. If there are more than one keypad or control unit, make sure they have a different ID then reset the group using keypad code: [user pin] [*] [6] [8] [#] or Perimeter Patrol "Reset All" this will allow both keypads to be recognised by all energisers in the group.

j. If using a PTE0210 keypad, enter the key sequence [*][6][8] [#] to automatically re-scan the group and check what energisers are connected.

k. Arm the group using keypad [1] [2] [3] [4] [*] [1] [0] [#] or

© JVA Technologies Pty. Ltd.

Perimeter Patrol, make sure all Energisers are activated.

Notes:

1. Members of a group can be individually switched on and off; even the master can be turned off via input or key switch (note that the Z14R does not have a key switch).

2. A slave will generate a General alarm if the keypad bus is broken between it and the group master.

3. After programming the Keypad may be disconnected, it is not required for group operation.

4. As of energiser firmware 7v83 and keypad firmware 1v09, Z28's should have an 'empty' ID between each Energiser. This means if the Z28 master ID=1, then the ID of the first slave should be 3, not 2.

5. When connected to Perimeter Patrol, the arm/disarm function of a keypad is disabled. Control of these functions is through the Perimeter Patrol interface.

6. A Keypad that is connected to a Slave Energiser that is disconnected from the Group, must have a KEYPAD ADDRESS set to 1. Otherwise the Energiser will not respond to commands.

GROUP MODE LINKING

© JVA Technologies Pty. Ltd.

www.jva-fence.com

DEALER

THE JVA LOGO IS A TRADEMARK OF JVA TECHNOLOGIES PTY LTD

© JVA TECHNOLOGIES PTY LTD